

THE LARVA OF *NEOCORDULIA BATESI LONGIPOLLEX* CALVERT, 1909 (ODONATA: CORDULIIDAE)

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Abstract.—The Neotropical genus *Neocordulia* is a rare, small, and very poorly known group of dragonflies, including eight species known to date. Only the larva of *N. biancoi* has been described. The larva of *N. b. longipollex* is characterized by: body densely covered with scale-like setae; frons strongly produced anteriorly in a shelf; antennae short with the third joint the longest; prementum abruptly narrowed basally; premental setae 5+4, palpal setae 5. Meso- and metasternum strongly hollowed out for reception of labium. Abdomen without lateral spines or dorsal protuberances; segment 10 reduced. Differences in frontal projection, proportion of antennomeres, number of premental and palpal setae, and presence/absence of abdominal spines, permit the separation of the larva of *N. b. longipollex* from that of *N. biancoi*.

The Neotropical genus *Neocordulia* includes eight species known to date (May, 1991), five of which are restricted to South America. All three Central American species occur in Costa Rica: *Neocordulia batesi longipollex* Calvert, 1909; *N. campana* May and Knopf, 1988 and *N. griphus* May, 1991. The northernmost record of *Neocordulia* is Oaxaca, Mexico (González, 1985), represented by *N. b. longipollex*.

This rather rare genus is very poorly known in distribution, immature stages, behavior, phylogenetic relationships, and other aspects. At present, only one larva has been described: *N. biancoi* from Venezuela (De Marmels, 1990). Here we describe the larva of *N. b. longipollex* with material from Costa Rica. This subspecies ranges from México to Panamá, being replaced in South America by *N. b. batesi* (May, 1991).

MATERIAL AND METHODS

The specimens were not reared but the exuviae were collected at a stream with a relatively high population of teneral adults of *N. b. longipollex*. Moreover, the other two species inhabiting Costa Rica have never been collected at this locality. Exuviae were preserved in 80% ethanol and are deposited at the Aquatic Insects Collection of Instituto de Ecología, Xalapa, Veracruz, México (IEXA), and in the personal collection of junior author. Illustrations were made under stereoscopic microscope using a camera lucida; all drawings by senior author.

Neocordulia batesi longipollex Calvert
(Figs. 1–11)

Material examined: 13 exuviae (ultimate instar) 9 ♂, 4 ♀. COSTA RICA: Prov. Limón; Guápiles, Río Danta, 200 m asl, 22-IV-1993, A. Ramírez, R. Novelo leg.

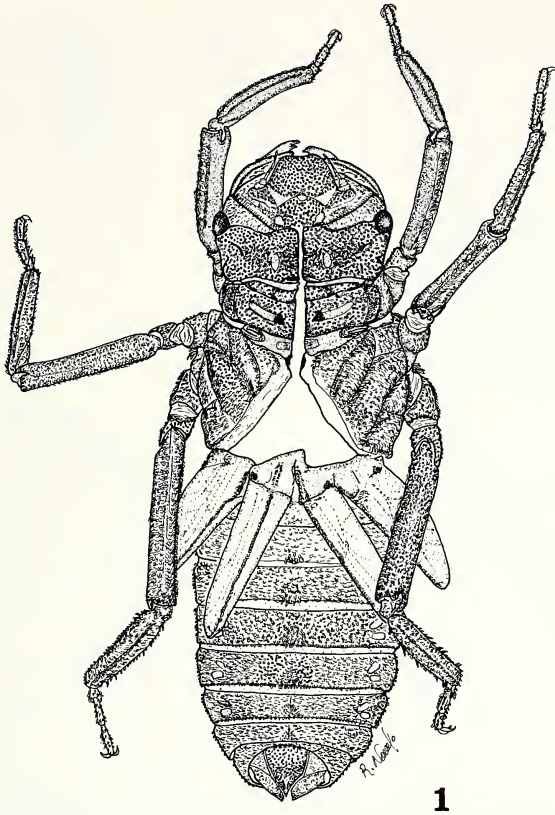
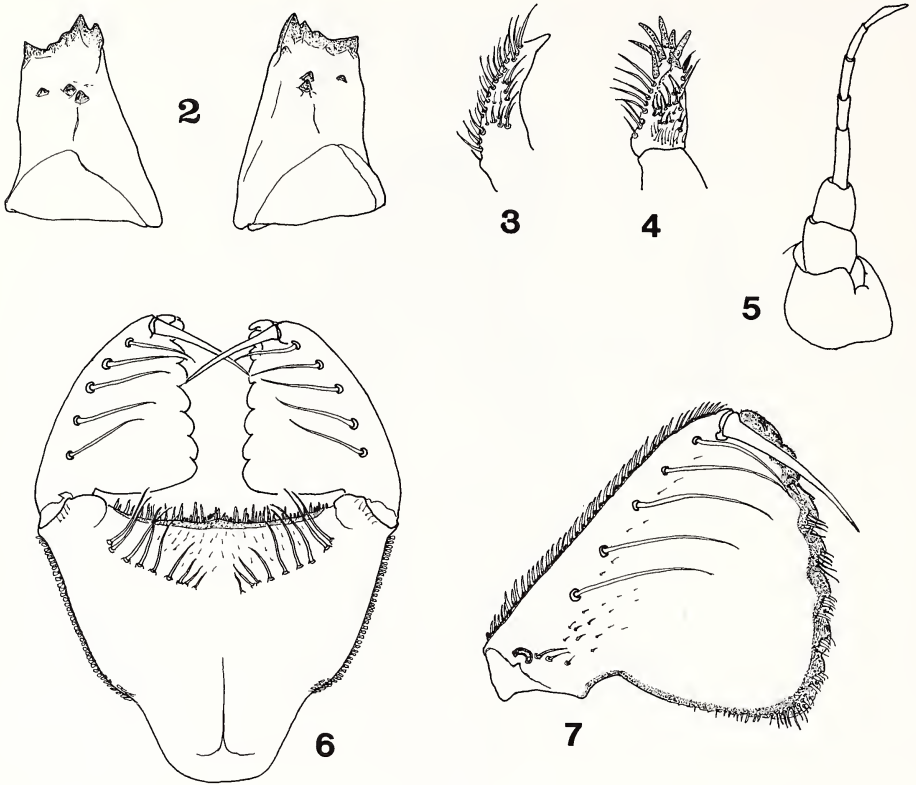


Fig. 1. *Neocordulia batesi longipollex*, exuvia of ultimate instar larva (δ), dorsal view.

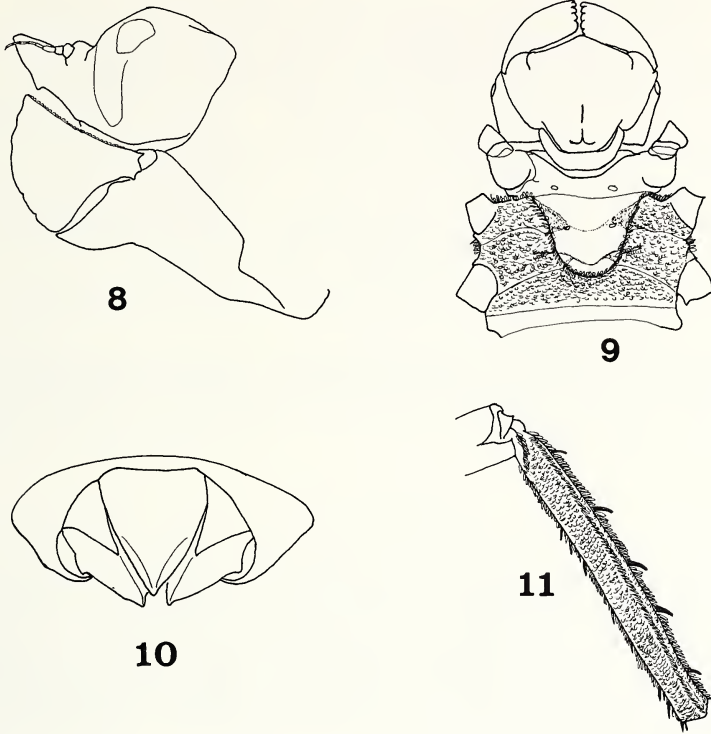
Description: Exuviae yellow-brown to brown; body robust, covered with scale-like setae; head large, as wide as remainder of body; legs rather short (e.g.: metafemora and metatibia together extending slightly beyond of the apex of abdomen); abdomen short, rounded at apical end.

Head wider than long; compound eyes small; frons strongly produced anteriorly in a notable shelf (Figs. 1, 8) with anterior edge slightly concave medially; hind angles of cephalic lobes produced in a straight, slightly raised border, covered with scale-like setae; occipital border sinuate. Antennae very short, 7-jointed, the third antennomere the longest and the fourth the shortest one; proportion of antennomeres: 0.92, 0.78, 1.0, 0.50, 0.71, 0.64, 0.85; scape and pedicel much wider than flagellomeres (Fig. 5). Anterior margin of labrum deeply notched at middle; labrum surface densely covered with long setae. Mandibles biramous, although the internal branch is reduced to three low, blunt-tipped, conical teeth (Fig. 2). Galeolaciniae with seven robust teeth, the dorsal three smaller than ventral four (Fig. 4); maxillary palpi covered with numerous, strong, long setae (Fig. 3). Prementum-postmentum articulation reaching the level of metacoxae;



Figs. 2-7. Details of morphology of *N. b. longipollex*. 2) Mandibles: a, left; b, right. 3) Apex of maxillary palp. 4) Galeolacinia. 5) Antenna. 6) Prementum, dorsal view. 7) Left labial palp.

prementum strongly narrowed at basal third, lateral margins with scale-like setae; ligula slightly serrated at its apical border, slightly produced medially, beset with robust spine-like setae; premental setae 5+4 to each side of midline (Fig. 6). Palpal setae 5 (Fig. 7). *Thorax*: Pronotum with lateral margins straight, directed upwards, its anterior and posterior angles rounded; posterior margin sinuate. Legs slender, densely cover with scale-like setae; metatibiae with 5-6 spur-like setae (Fig. 11). Wing sheaths reaching the abdominal segment 6, parallel-sided (in Fig. 1 they appear as divergent but it is due to distorsion of the exuvia). Meso- and metasternum strongly hollowed out to provide space for the labium, this impression fringed with scale-like setae (Fig. 9), which probably act as proprioceptors. *Abdomen* without dorsal protuberances or lateral spines; without a definite color pattern at least in exuviae; abdominal segment 10 reduced as compared to the preceding ones (Figs. 1, 10); epiproct, paraprocts and cerci pyramidal, acutely pointed, proportions: 1.0, 0.74 and 0.52 respectively (Fig. 10). Female gonapophyses vestigial, reduced to small triangular plates.



Figs. 8–11. Details of morphology of *N. b. longipollex*. 8) Left lateral view of head showing frontal projection. 9) Thorax, ventral view, showing cavity of meso- and metasternum. 10) Abdominal segment 10 and caudal appendages. 11) Left metatibia, external view.

Measurements (in mm)—Total length 19.5–21.0; abdomen 11–11.5; head: width 5.0, length 3.7–4.0; metafemur 5.0–5.5; paraprocts 1.4, epiproct 1.9.

Habitat—Exuviae were found at a rocky stream where the water flow is rapid; they were attached to vertical walls of big rocks situated close to the center of the stream course; teneral adults were captured hanging under leaves to 2–3 m above the water level.

DISCUSSION

May (1991) proposed the division of *Neocordulia* into two subgenera based exclusively in adult characteristics: *N. (Neocordulia)* and *N. (Mesocordulia)*. The only larva hitherto known belongs to the former: *N. (Neocordulia) biancoi*. The larva here described belongs to the second one: *N. (Mesocordulia) batesi longipollex*. Differences found between larvae of these two species, which are summarized in Table 1, support May's proposition.

Table 1. Comparative table of the larval features of *Neocordulia*.

Features	<i>N. (Neocordulia) biancoi</i>	<i>N. (Mesocordulia) batesi longipollex</i>
Frons	Moderately produced in a sharp, straight, transverse ridge	Strongly produced in a notable shelf, slightly concave at middle
Raptorial setae	Premental 7 + 4 Palpal 7	Premental 5 + 4 Palpal 5
Antennae	Sixth antennomere the longest	Third antennomere the longest
Pronotum	Hind margin ending on each side in a conical tubercle	Hind margin ending rounded on each side
Femora	With spur-like setae on dorsal carinae	Without such structures
Abdomen	Lateral spines on segments 8-9	No lateral spines at all
Caudal appendages	Paraprocts notably longer than epiproct	Paraprocts shorter than epiproct

LITERATURE CITED

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